

REMARKS/ARGUMENTS

Claims 1-14 and 16-18 remain in this application. Claim 4 has been amended to be limited to dioxiranyl 1,5,7,11-tetraoxaspiro[5.5]undecane ("TOSUs"), and to correct a typographical error. Similarly, Claim 16 has been amended to clarify that the claimed compounds include novel TOSUs generally (including the addition of the TOSU compounds shown in FIGs. 7, 11, and 12). New Claim 17 is directed to the novel dioxiranyl TOSUs, and Claim 18 recites certain novel TOSUs having two substituents on the TOSU ring system. Dependent Claim 15 has been canceled.

I. DOUBLE PATENTING

In paragraph 1-2 of the Office Action, the Examiner rejected Claims 14-16 on the ground of non-statutory obviousness-type double patenting based on Claims 1-2 of U.S. Patent No. 6,653,486. In addition, the Examiner rejected Claims 1-16 on the ground of non-statutory obviousness-type double patenting based on Claims 1-29 of U.S. Patent No. 6,358,865.

Obviousness-type double patenting is a judge-made doctrine that prevents an extension of the patent right beyond the statutory time limit. It requires rejection of an application claim only when the claimed subject matter is not patentably distinct from the subject matter claimed in a commonly owned patent. See In re Braat, 937 F.2d 589, 592, 19 USPQ2d 1289, 1291-92 (Fed. Cir. 1991). The purpose is to prevent an unjustified extension of the term of the right to exclude granted by a patent by allowing a second patent claiming an obvious variant of the same invention to issue to the same owner later. See In re Goodman, 11 F.3d 1046, 1052, 29 USPQ2d 2010, 2015 (Fed. Cir. 1993).

The analysis in an obviousness-type double patenting rejection parallels the guidelines of a 35 U.S.C. § 103 obviousness determination. However, while a Section 103 obvious analysis is

based on the entirety of the disclosure in the prior art, an obviousness-type double patenting rejection is grounded on a comparison of the invention to the claims, **and only the claims**, of the reference. See generally MPEP 804 ("When considering whether the invention defined in a claim of an application would have been an obvious variation of the invention defined in the claim of a patent, the disclosure of the patent may not be used as prior art. See General Foods Corp. v. Studiengesellschaft Kohle mbH, 972 F.2d 1272, 1279, 23 USPQ2d 1839, 1846 (Fed. Cir. 1992)").

1. The '486 Patent

In this case, independent Claim 14 is directed to a method of making a dioxiranyl 1,5,7,11-tetraoxaspiro[5.5]undecane comprising certain steps, including transesterification of certain propane diols to obtain an unsaturated TOSUs and epoxidizing the TOSUs to obtain dioxiranyl TOSUs. In contrast, the claims of the '486 patent are compound claims, and do not describe a method of making at all. There is no mention of propane diols, transesterification, or epoxidation in the claims of the '486 Patent. Thus, Applicant respectfully submits that Claim 14 is non-obvious in view of the '486 Patent. Applicant requests withdrawal of the double patenting rejection.

Independent Claim 16 is directed to specific 1,5,7,11-tetraoxaspiro[5.5]undecane compounds. Applicant respectfully submits that none of the claimed compounds in Claim 16 are rendered obvious by Claims 1 or 2 of the '486 Patent. With respect to genus Claim 1 of the '486 Patent, Applicant notes that the genus describes a wide range of compounds. Applicant submits that one skilled in the art would not be motivated to select the R1 to R8 substituents recited in genus Claim 1 of the '486 Patent in a manner that would arrive at the specific compounds recited in Claim 16 of the present application. Further, as to Claim 2 of the '486 Patent, the claimed

compounds differ with regard to multiple substituents at multiple different positions. For example, most of the compounds recited in Claim 2 of the '486 Patent have ethyl substituents at the 3 and 9 positions, in addition to being substituted with the other ring systems. In contrast, most of the compounds in Claim 16 of the present invention have a single substitution at the 3 and 9 positions of the TOSU. Thus, in general, the compounds of the '486 Patent have a total of three or four substitutions to the TOSU ring while most of the compounds in Claim 16 have only two substitutions to the TOSU ring. Applicant respectfully submits that it would be non-obvious to arrive at the compounds in Claim 16 of the present application based on Claims 1 or 2 of the '486 Patent. Thus, Applicant respectfully requests withdrawal of the double patenting rejection in light of the '486 Patent.

2. The '865 Patent.

Applicant also respectfully traverses the double patenting rejection of Claims 1-16 in the present application based on Claims 1-29 of the '865 Patent. Independent Claims 1 and 13 of the present invention expressly require: (1) a dioxiranyl 1,5,7,11-tetraoxaspiro [5.5]undecane, (2) a dioxirane, and (3) an initiator capable of cationic polymerization of the resin. In contrast, the claims of the '865 Patent (e.g. dependent Claims 4, 25) are directed to a photopolymerizable composition or a dental restorative material comprising a large genus of numerous TOSUs. Applicant respectfully submits that one skilled in the art would not be motivated to select dioxiranyl 1,5,7,11-tetraoxaspiro[5.5]undecanes from the laundry list of the various TOSUs recited in the claims of the '865 Patent. Withdrawal of the double patenting rejection of Claims 1-13 is therefore requested.

Independent Claim 14 is directed to a method of making a dioxiranyl 1,5,7,11-tetraoxaspiro[5.5]undecane comprising certain steps, including the transesterification of certain

propane diols to obtain an unsaturated TOSU and epoxidizing the TOSUs to obtain the dioxiranyl TOSUs. The claims of the '865 Patent are composition of matter claims, and do not describe a method of making at all. Thus, Applicant respectfully submits that the double patenting rejection as to Claim 14 be withdrawn.

Claim 16 is directed to specific 1,5,7,11-tetraoxaspiro[5.5]undecane compounds. Applicant respectfully submits that none of the claimed compounds in Claim 16 are rendered obvious by Claims 1-29 of the '865 Patent. The broad genus claims of Claims 3 and 25 of the '865 Patent would not motivate one skilled in the art would not be motivated to select the R1 to R8 substituents recited in a manner that would arrive at the specific compounds recited in Claim 16 of the present application. Applicant respectfully submits that it would be non-obvious to arrive at the compounds in Claim 16 of the present application based on the claims of the '865 Patent. Thus, Applicant respectfully requests withdrawal of the double patenting rejection based on the '865 Patent.

II. CLAIM REJECTIONS SECTION 102

In paragraph 4-5, the Examiner rejected Claims 1-16 as being anticipated under 35 U.S.C. § 102(e) by Chappelow et al., U.S. Patent No. 6,458,865 (and its corresponding publication 2002/0013380) and its divisional U.S. Patent No. 6,653,486 (and its corresponding publication 2003/0119931). Since these patents are related as parent and divisional patents such that their disclosure is the same (except for the claims), like the Examiner, Applicant's remarks will be directed to the '486 Patent, but the remarks are equally applicable to all of the cited references.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v.

Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicant respectfully submits that the claimed invention is not anticipated by the '486 Patent. Independent Claim 1 recites (1) a dioxiranyl 1,5,7,11-tetraoxaspiro[5.5]undecane, (2) a dioxirane, and (3) an initiator capable of cationic polymerization of the resin. Similarly, independent Claim 13 requires (1) a dioxiranyl 1,5,7,11-tetraoxaspiro[5.5]undecane, (2) a dioxirane, (3) and initiator capable of cationic polymerization of the resin, and (4) a dental filler.

As discussed above, the '486 Patent teaches a broad class of spiroorthocarbonate compounds. While various TOSUs are disclosed, many of the compounds disclosed in the '486 patent contain only one epoxide functionality. Thus, Applicant respectfully submits that the Applicant's discovery that combining dioxiranyl TOSUs with the dioxiranes/initiators as claimed is not anticipated by the '486 Patent.

On page 5 of the Office Action, the Examiner relies on Tables 4 and 7B of the '486 Patent, in particular to reject independent Claims 1 and 13. Applicant has carefully reviewed Tables 4 and 7B as cited by the Examiner and respectfully contends that the anticipation rejection is improper. In particular, the TOSUs used in Table 4 are as follows:

DEDPM: 3,9-Diethyl -3,9-dipropionyloxymethyl-1,5,7,11-tetraoxaspiro[5.5]undecane

DECHE: 5,5-Diethyl-19-oxadispiro[1,3-dioxane-2,2'-1,3-dioxane-5'4"]-bicyclo[4.1.0]heptane]

DM: 2,8-Dimethyl-1,5,7,11-tetraoxaspiro[5.5]undecane

None of these compounds are dioxiranyl TOSUs as claimed in independent Claims 1 and 13. Applicant has carefully reviewed the other examples and believes that none teach a dioxiranyl TOSU combined with a dioxane and a cationic initiator as claimed. Thus, withdrawal of the anticipation rejection is requested.

On page 5 of the Office Action, the Examiner also rejected independent Claim 14 as anticipated. Importantly, in addition to the transesterification and epoxidation steps, Claim 14 recites: "providing an alkyl substituted unsaturated cyclohexenyl group bonded to a propane diol by a flexible linkage selected from the group consisting of alkylene, oxyalkylene, and alkyleneoxy linkages." Applicant has carefully reviewed the '486 Patent and respectfully contends that this claim limitation is not anticipated by the cited reference.

To support the 102(e) anticipation rejection of independent Claim 14, the Examiner cites the following paragraph:

The SOC's can be prepared by transesterification of tetraalkylorthocarbonates such as tetraethylorthocarbonate or tetramethylorthocarbonate and the corresponding diol using an aromatic hydrocarbon solvent such as toluene or xylene in the presence of a catalytic amount of an organic acid such as p-toluene sulfonic acid. The reaction is driven to completion by removal of the alcohol and is purified by distillation or chromatography and/or recrystallization. The spiroorthocarbonate compounds can also be prepared by other reactions involving thiophosgenation and organotin intermediates. See generally, R. K. Sadhir & R. M. Luck, Expanding Monomers: Synthesis, Characterization and Applications, CRC Press, Boca Raton, Fla. (1992).

(emphasis added) Applicant respectfully contends that the "corresponding diol" does not teach the claimed step of "providing an alkyl substituted unsaturated cyclohexenyl group bonded to a propane diol by a flexible linkage selected from the group consisting of alkylene, oxyalkylene, and alkyleneoxy linkages." Thus, Applicant request that the Examiner withdraw the anticipation rejection as to Claim 14.

Lastly, as discussed previously, independent Claim 16 (and new dependent Claims 17 and 18) are directed to specific 1,5,7,11-tetraoxaspiro[5.5]undecane compounds. Applicant

respectfully submits that none of the claimed compounds are anticipated by the '486 Patent.¹ It is well established that the disclosure of a genus in the prior art is not necessarily a disclosure of every species that is a member of that genus. See In re Baird, 16, F.3d 380, 382 (Fed. Cir. 1994). There may be many species encompassed within a genus that are not disclosed by a mere disclosure of the genus. Applicant notes that the genus described in the '486 Patent is directed a wide range of compounds. Applicant submits that one skilled in the art would not be motivated to select the R1 to R8 substituents recited in the '486 Patent in a manner that would arrive at the specific compounds recited in Claim 16 of the present application. As discussed above, the compounds disclosed in '486 Patent have one or more ethyl substituents at the 3 and 9 positions, in addition to being substituted with the other ring systems. In contrast, most of the compounds in Claim 16 of the present invention have a single substitution at the 3 and 9 positions of the TOSU. Thus, in general, the compounds of the '486 Patent have a total of three or four substitutions to the TOSU ring while most of the compounds in Claim 16 have only two substitutions to the TOSU ring. Applicant respectfully submits that it would be non-obvious to arrive at the compounds in Claim 16 of the present application based the '486 Patent. Thus, Applicant respectfully requests withdrawal of the anticipation rejection in light of the '486 Patent.

In view of the corresponding remarks contained herein, reconsideration and allowance of the application by the Examiner is requested. Applicant submits that the independent claims and

¹On page 4 of the Office Action, the Examiner relied upon columns 3 and 17-48 as disclosing TOSUs that contain "at least one" epoxy group." The Examiner stated generally that the compounds of Claims 4 and 15-16 "appear" to be found in these citations but did not otherwise identify any of the specific compounds that are actually disclosed.

the claims depending therefrom are patentable over the references of record and are in condition for allowance. Such action is respectfully requested.

Acknowledgment of receipt is respectfully requested.

Respectfully submitted,

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